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ABSTRACT

An evaluation of the Honolulu (Hawaii) School District's program of supplementary instruction to limited English proficient students is presented. The program was designed to aid in the adjustment to the American culture and school life in Hawaii. The evaluation addressed whether the program is meeting its objectives, whether English second language (ESL) instruction, as contrasted with bilingual instruction, should be continued, whether the program's pull-out design should be continued, and how program costs relate to outcomes. Results show that participants are making gains in oral English, reading, language arts, and mathematics beyond expectations of comparable students in the regular classes, as measured by standardized norm-referenced tests. In narrowing the achievement gap caused by their limited English proficiency, the students have in many instances surpassed the national growth norms. In addition, the students are generally doing satisfactory or better work in the regular classroom. It is concluded that the pull-out setting and ESL instruction are cost-effective. (MSE)

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SLEP Student Achievement: Some Pertinent Variables and Policy Implications

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SLEP Student Achievement: Some Pertinent Variables and Policy Implications

ABSTRACT

The Honolulu School District offers supplementary instruction to students whose dominant language is not English. The SLEP Program seeks to provide a smooth transition for these youngsters to adjust to the American culture and regular school life in Hawaii. Its objective is to improve the students' English language skills so that they may function effectively in the regular classroom. The present research provides answers to a set of policy questions relating to the operations and outcomes of the SLEP Program. Specifically, the research shows that program participants are making achievement gains in oral English, reading, language arts and mathematics beyond what is expected of comparable students in the regular classroom, as measured by standardized norm-referenced tests. In narrowing the achievement gap caused by their limited English proficiency, these students have, in many instances, surpassed the growth rate of comparable national groups, as reflected in test norms. Furthermore, as a group, they are doing satisfactory or better work in the regular classroom, with a failure rate of 5 % or less in reading, language arts, mathematics and speaking/listening. The present

research provides support for the popular use of the pull-out setting and ESL instruction in the SLEP Program from a cost and effect standpoint.

SLEP Student Achievement: Some Pertinent Variables and Policy Implications

The Program

The Honolulu School District operates the Students of Limited English Proficiency (SLEP) Program in 55 schools, serving some 4,000 students in kindergarten through high school grades. Program staff consists of 160 permanent teachers, temporary teachers and educational assistants. The program, costing approximately $2.2 million a year, serves students whose dominant language is not English and whose limitation in the use of English prevents them from functioning effectively in the regular classroom. The overall objective of the program is to help these students to adjust to school life and the American culture in the Hawaiian setting. The program provides supplementary instruction in basic communication skills to enable these students to participate in the regular classroom instruction and school activities appropriate for their age and grade level.

Students are selected to participate in the program on the basis of language dominance ratings as determined by criteria established by the Hawaii State Department of Education. Specifically, students who receive language dominance ratings of 1 and 2 are eligible and required to

participate. Students who receive language dominance ratings of 3, 4 or 5 and who score below the 25th percentile on the Metropolitan Achievement Test (MAT) in reading, language arts and mathematics are also eligible and required to participate. Students exit the program when they reach a language dominance rating of 3 or above and score at or above the 25th percentile on the MAT in reading, language arts and mathematics.

Program participants are quite evenly distributed among the various grade levels, with slightly heavier concentration at kindergarten and grade 10. The single largest ethnic group consists of Filipino youngsters who represent approximately one-third of the SLEP enrollment. The other major ethnic groups are Indo-Chinese, Samoan and Korean. Home languages include Ilokano, Samoan, Cantonese, Korean and Vietnamese.

Most (60 %) of the SLEP schools are located in urban Honolulu. The others are in suburban areas. In most instances (60 %), program participants receive instruction in a pull-out setting. The remainder consists of a combination of other arrangements (e.g., self-contained, intervention).

The SLEP instruction has a heavy aural-oral emphasis, generally following the principles of psycholinguistics.

English as a Second Language (ESL) is the most common type of instruction. Over one-third of the elementary classes and about one-fifth of the secondary classes provide ESL instruction. Bilingual instruction, akin to what is generally labeled as "structured immersion," is another major type of instruction. The critical difference between ESL and bilingual lies in the use of English. English is used in ESL at all times. Some native language is used in the bilingual instruction. In both cases, the SLEP instruction is supplementary. For the rest of the school day, the students return to the regular instruction.

At the elementary grades (k-6), the average SLEP class consists of 9 students. Class size increases to 12 at the intermediate grades (7 and 8) and to 17 at high school grades (9-12). The average class is taught by one or two project staff. The average staff has been with the program for four to five years and speaks one or two languages other than English. In the average class, students come from four to five different language groups. They receive approximately 70 minutes of SLEP instruction daily.

Research Design

The research described in this paper was part of a larger evaluation effort conducted for the Honolulu School District during the 1985-87 school years. It addressed several

policy relevant variables. These included program impact, type of instruction, project setting and cost-effectiveness. Specifically, the research sought answers to the following questions:

1. Is the SLEP Program meeting its objectives?

2. Is there evidence to support the continued use of ESL in the program?

3. Is there evidence to support the continued use of the pull-out setting in the program?

4. How are program costs related to outcomes?

To answer these questions, the research looked at two primary student achievement areas: achievement gains as measured by standardized norm-referenced tests and performance in regular school work as indicated by course grades.

In the norm-referenced mode, a pretest-posttest design was used to provide measures of achievement gains. The same design has been used in the assessment of other compensatory education programs (e.g., Chapter 1) across the country for the past decade. The norm-referenced model (Tallmadge & Wood, 1982) assumes that with regular schooling, students

will generally maintain their achievement level, as measured by percentile scores, between pretest and posttest. Any gain in percentile status is therefore attributed to the effects of some kind of special treatment (e.g., additional instruction). Tallmadge (1982) has demonstrated that this equi-percentile assumption generally holds true when testing occur at or near the mid-points of the norming dates.

The norm-referenced model first converts raw scores to percentiles. Percentile scores are then converted to the normal curve equivalents (NCEs). Unlike percentiles, NCEs are normalized to form an equal-interval scale and are therefore suitable for statistical analysis. With a mean of 50 and a standard deviation of 21.06, the NCE scale coincides with the percentile scale at points 1, 50 and 99. Under the equi-percentile assumption, the no-treatment expectation for the general student population is zero percentile or NCE gain. With students of limited English proficiency, however, it is assumed that they would lag further behind if not provided with extra help. In other words, the no-treatment expectation is a loss in percentile or NCE status. The SLEP Program serves to narrow or close this achievement gap.

Two primary instruments used in the norm-referenced mode were the Metropolitan Achievement Test (1978) and the Basic

Inventory of Natural Language (1979). Two compelling reasons supported the use of these instruments:

1. Both tests have been used in the SLEP Program for a number of years. Their use in the present research created the least amount of disruption in the day-to-day program operations.
2. Both tests met the criteria relating to validity and reliability of evaluation instruments. Program staff reviewed and selected the tests to achieve the best possible match with the SLEP curriculum, ensuring the content or instructional validity of the instruments. The MAT authors (The Psychological Corporation, 1978) reported K-R 20 reliabilities in the 90's for the basic battery. For the subtests, the reliabilities ranged from .72 (language art, pre-primer) to .96 (reading, elementary). The BINL manual (Herbert, 1979) reported split-half reliabilities in the 90's. In a test evaluation study conducted recently (Yap, 1983), the BINL showed test-retest reliabilities in the high 80's.

The present research also examined the performance of SLEP students in their regular school work. The design called for data in four areas: reading, language arts, mathematics and listening/speaking. For each of these areas, end-of-year grade point averages (GPAs) served as an

indicator of student performance level. A special data form was created for project staff to collect GPA data from school files.

In addition to student achievement data, a program implementation checklist and a teacher survey were developed to gather information on program implementation variables including project setting, type of instruction and extent of use of English. These instruments were field tested and revised in 1985 before their use in the present research.

Program cost data, to be extracted for each project school from fiscal records maintained at the district office, included expenditures on personnel, materials, supplies and equipment. We excluded district and state administrative costs as well as donated resources (e.g., parent volunteer time) on the assumption that those costs would be evenly distributed among the various project schools. Costs of facilities and utilities were also excluded because they proved to be extremely difficult to estimate with any degree of accuracy. A special data form was created to collect data on program costs.

Data Collection

In accordance with guidelines established for the norm-referenced model (Tallmadge & Wood, 1982), the MAT was

administered to SLEP participants on or close to the norms dates in October and April. The BINL was also given at about the same times. Students with language dominance ratings of 1 and 2 took the BINL only. Many of these students were immigrants who had just arrived from their native countries and were non-readers of English.

Test administration was conducted by the Honolulu District or SLEP project staff. The BINL, an oral-aural language production test, was given individually. The MAT subtests of reading (MAT-R), language arts (MAT-L) and mathematics (MAT-M) were administered as group tests. Project students took Form JS of the MAT survey battery in October as pretest and Form KS in April as posttest. Specific test levels administered to the various grade levels were as follows:

	Grade Level	
Test Level	Pre	Post
Pre-primer	K	
Primer	1	K
Primary 1	2	1
Primary 2	3	2
Elementary	4	3,4
Intermediate	5,6	5,6
Advanced 1	7,8,9	7,8,9
Advanced 2	10,11,12	10,11,12

The BINL items consisted of 40 large story starter pictures. During test administration, each student selected 3 to 5 pictures and responded to the items by making up stories about the pictures or about some of the people or things in the pictures. The student also used the pictures as a jumping off point to talk about a personal experience. Student responses were tape recorded to facilitate scoring. The BINL scores were based on 10 speech samples taken from the student during the test.

In May and June of the school year, SLEP program staff reviewed the school records of each SLEP participant and obtained GPA data on reading (GPA-R), language arts (GPA-L), mathematics (GPA-M) and speaking/listening (GPA-S/L). Since grading practices differed from school to school, grade designations were converted to a common five-point scale as follows:

A = 5	Excellent = 5	Pass = 4
B = 4	Satisfactory = 3	Fail = 1
C = 3	Unsatisfactory = 1	
D = 2		
F = 1		

The GPA data were transcribed on a set of data summary forms.

The program implementation checklist and the teacher survey were administered by district office staff in May of the school year to provide data on project setting, type of instruction, and English use in class. These data were collected for each SLEP class. Program cost data (including personnel, materials, supplies and equipment) were gathered for each project school.

Data Analysis

The MAT raw scores were first converted to percentiles and then to NCEs to facilitate data aggregation. For each achievement area, individual students' NCE scores were matched for pretest and posttest. Pretest NCE score was subtracted from the posttest NCE score to obtain an NCE gain score. Students missing one or both test scores were excluded from the analysis. Based on students with both pretest and posttest data, an average NCE gain score was calculated for each of the SLEP class. The same procedure was applied to the BINL data to obtain an average NCE gain for each SLEP class.

The GPA data were first converted to the common five-point scale described earlier. For each basic skill area, the converted GPAs were averaged to obtain a mean GPA for each SLEP class.

Using the SLEP class as the unit of analysis, we computed means and standard deviations for the eight student achievement variables, separately for elementary (k-6), intermediate (7 and 8), and high school (9-12) grades.

Since a majority of the project schools used the pull-out setting and the primary types of instruction were ESL and bilingual, we decided to dichotomize these variables as follows:

Project Setting	Type of Instruction
1 = Pull-Out	1 = ESL
2 = Others	2 = Bilingual

Comparisons were then made between the two project settings and between the two types of instruction with respect to each of the student achievement variables. A series of t tests was conducted to assess the statistical significance of the differences.

We then examined each comparison determine whether the difference, regardless of statistical significance, favored the pull-out or other settings. A chi square test was conducted on the difference between the number of instances in which pull-out was favored and the number of instances in

which other settings were favored. A similar analysis was performed on the data pertaining to types of instruction.

The extent of English use was reported by the SLEP instructional staff in the teacher survey. For purposes of analysis, these data were coded as follows:

1 = Almost always
2 = Three-fourths of the time
3 = One-half of the time
4 = One-fourth of the time
5 = Almost no time

A correlational analysis was then performed on the data to determine what relationships, if any, existed between use of English and student achievement gains in each of the subject areas.

The cost analysis included expenditures on personnel, materials, supplies and equipment. For reasons explained earlier, it excluded district or state level administrative costs as well as costs of facilities and utilities. Total project costs for each SLEP school were calculated from fiscal records maintained at the district office. We then derived a per-pupil cost by dividing total project costs by the number of SLEP participants at the school.

The per-pupil cost was in turn divided by the average achievement gain scores for each school to provide an index of cost-effectiveness for each of the achievement areas. These indices were aggregated separately for elementary (k-6) and secondary (7-12) grade spans. To avoid erratic and misleading indices of cost-effectiveness, fractional NCE gains that were less than 1.0 were rounded to 1.0. For the same reason, negative gains were replaced with zero gains. Correlational analyses were performed on (a) per-pupil costs and NCE gains and (b) NCE gains and cost-effectiveness indices for each of the subject areas.

Results

Program Impact

The norm-referenced test data indicated that the average SLEP participant made sizable NCE gains in oral language, reading, language arts and mathematics. The only exception was MAT-L at the high school level where a negative gain occurred in 1985-86. Consistent with experience in other compensatory education programs (e.g., Chapter 1), lower grades tended to show greater gains. The achievement gains on the BINL were particularly impressive, probably because of the strong match between the test and the SLEP

curriculum. The favorable performance pattern was evident for both school years included in the study.

The positive NCE gains suggest that, on the average, SLEP participants not only were able to catch up with their non-SLEP counterparts but also surpassed them in most instances. They narrowed the achievement gap caused by their limited proficiency in English and demonstrated an achievement level that was above the no-treatment expectation.

The GPA data showed that the average SLEP student was performing well in regular school work. In most instances, the performance received a rating of 3 or above on a 5-point scale. Their school work in mathematics, language arts, reading and speaking/listening was judged to be satisfactory or better. This positive pattern was most evident at the intermediate and high school levels. A further analysis of the GPA data indicated that only a very small percentage (generally 5 percent or less) of the SLEP students were failing in each of the four subject areas.

Tables 1-3 present summaries of the program impact data.

Tables 1-3 about here

The Pull-Out Setting

The comparisons between the pull-out setting and other instructional arrangements (e.g., in-class) provided inconsistent evidence which favored the former in some instances and the latter in others. Moreover, none of the comparisons revealed any statistically significant differences at the .05 level. To further examine the evidence, the result of each comparison was coded as a plus (+) or a minus (-). A plus indicates that the difference in mean NCE gain scores, regardless of its statistical significance, favored the pull-out setting. A minus means that the difference favored the other settings. The pattern of pluses and minuses is depicted in Table 4. A chi square test was then performed on the frequencies of pluses and minuses, separately for elementary, intermediate and high school grades.

Table 4 about here

The 1986-87 data revealed a significant chi square value for the intermediate and high school grades. For the intermediate grades, the results (chi square = 4.50, $p < .05$) indicated that there were significantly more minuses than pluses (7 versus 1). Thus, overall, the data

favored the other instructional settings. However, the reverse holds true at the high school grades. That is, the results showed significantly more pluses than minuses (chi square = 4.50, $p < .05$), favoring the pull-out setting. The elementary data provided a non-significant chi square value.

The 1986-87 data provided a significant chi square value for the elementary grades (chi square = 4.50, $p < .05$), favoring the pull-out setting. Chi square values for the intermediate and high school grades were statistically non-significant at the .05 level.

ESL Versus Bilingual

The data provided no consistent evidence favoring any one type of instructional service. In fact, only one of the comparisons (MAT-R at the intermediate level) revealed a statistically significant difference ($p < .01$). To study the evidence further, each comparison was examined and coded as a plus (favoring ESL) or a minus (favoring bilingual), regardless of the statistical significance of the difference. Table 5 presents a tally of the pluses and minuses. We then performed a chi square test on the frequency data, separately for elementary, intermediate and high school levels.

Table 5 about here

For both school years, none of the chi square values turned out to be significant at the .05 level. Thus, the data provided no evidence of superiority of one type of instructional service over the other.

Use of English

Although SLEP instruction is provided mostly in English, some classes (e.g., bilingual classes) also provide for the use of the students' native language. The extent of English use (up to 50 %) varies from class to class. The data indicated that the varied use of English did not have any significant effect on student performance both on the standardized norm-referenced tests and in their regular school work. The relationships between use of English on the one hand and NCE gains and GPAs on the other, were weak or non-existent. The correlation coefficients (summarized in Table 6) were low in magnitude and statistically non-significant at the .05 level.

Table 6 about here

Cost Analysis

The data indicated that it cost approximately $567 to provide SLEP services to the average elementary student in the district. Relative to the outcome variables, per-pupil cost appeared to be a rather stable element, with the lowest coefficient of variation (S.D./mean x 100). This implies that per-pupil cost varied relatively little from project to project whereas project outcomes differed more substantially. Also, it generally follows that the relationship between project costs and outcomes would be weak. As shown in Table 7, the correlations between per-pupil costs and NCE gains were low and none was statistically significant at the .05 level. Some of the coefficients were, in fact, negative.

At the secondary level, the data showed that it cost $498 to provide SLEP services to the average student. As in the elementary grades, there was much more variation in project outcomes than in project costs, as indicated by the coefficient of variation. Also, there appeared to be only a weak, if any, relationship between per-pupil costs and outcomes as measured by NCE gains. Only one of the correlation coefficients (for MAT-Math) was statistically significant ($r = .52$, $p < .05$).

To further examine the relationships between program costs and outcomes, we computed a cost-effectiveness ratio by dividing per-pupil cost with the respective NCE gain scores. Thus, a lower ratio indicates a higher level of cost-effectiveness. The cost effectiveness ratio is generally considered to be a more comprehensive index of program impact than a simple measure of effectiveness (e.g., NCE gains). It is possible, for example, for a program to be more effective but less cost-effective than another. To examine the overlap between effectiveness and cost-effectiveness of the SLEP Program, we computed correlations between the cost-effectiveness ratios and NCE gains for each subject area. The results, summarized in Table 8, indicated that there was substantial overlap between the two indices. All correlation coefficients were of high magnitude and were significant at the .01 level. These results suggest that, by and large, an effective SLEP project also tended to be a cost-effective project, effectiveness and cost-effectiveness being highly correlated.

Table 8 about here

Discussion

The continued influx of immigrant families to Hawaii, especially Southeast Asian refugees, has created a tremendous burden on the educational system in the state. The Honolulu School District, situated in the major urban center of the state, has borne the brunt of the demand for special educational services to meet the needs of these immigrant families. The SLEP Program, a vital component of the district's effort to meet the challenge, seeks to provide a smooth transition for the immigrant children to adjust to the American culture and regular school life in Hawaii. It attempts to do this by providing supplementary educational services to these youngsters to improve their English language skills so that they may function effectively in the regular classroom.

The present research provided ample evidence that the district has been successful in meeting this goal. The data show that SLEP participants performed well on standardized norm-referenced tests. Their performance, in fact, exceeded the no-treatment expectation. These youngsters were catching up with their non-SLEP counterparts and narrowing the achievement gap. In most instances, they made greater achievement gains than what was expected of regular students who started off at the same percentile status.

The SLEP students were also doing well in their regular school work, making satisfactory or better grades in the basic skill areas of mathematics, language arts, reading and speaking/listening. A very small percentage (5 % or less) of them were failing in any of these subject areas. In the larger evaluation study of which the present research was a part, there also was ample evidence that the SLEP participants maintained the same positive performance pattern after they exited the program for a year or longer.

Although this research provided no clear evidence on the superiority of one setting over another, the continued use of the pull-out setting, particularly at the elementary level, appears reasonable. The 1985-86 data favored other settings at the intermediate level, supported the pull-out setting at the high school level, and provided ambiguous findings for the elementary level. The 1986-87 data favored the pull-out setting at the elementary level and provided equivocal evidence for the intermediate and high school levels. In the larger evaluation study, the per-pupil cost for the pull-out setting was estimated to be $554 for the elementary grades, slightly below the overall per-pupil cost of $567. Thus, the continued use of the pull-out setting, at least at the elementary grades, appears supportable from a cost and effect standpoint.

There has been much controversy over native language instruction in bilingual education. More recently, the debate has intensified over the mandated use of native language in federal programs serving youngsters whose first language is not English (Baker & de Kanter, 1983; Willig, 1985; Baker, 1987; Willig, 1987). The present research indicated that there are no significant relationships between English use (or use of the native language) and the achievement of SLEP participants, both on norm-referenced tests and in their regular school work. In many instances, the correlations were virtually zero. This finding is further supported by the various comparisons between ESL and bilingual instruction, the critical difference between the two being the use of native languages (up to 50 % of class time) in the latter. The comparisons provided no consistent evidence of superiority of one type of instruction over the other with respect to student performance. The per-pupil cost for ESL instruction at the elementary level was estimated to be $476, substantially lower than the overall per-pupil cost of $567. At the secondary level, the ESL per-pupil cost was $414, also much lower than the overall per-pupil cost of $498. The continued use of ESL instruction appears to be a safe bet in providing effective educational services to SLEP participants.

Generally, the cost analysis did not reveal any significant relationships between program costs and

outcomes. Only in one instance was the correlation between per-pupil costs and NCE gains statistically significant. All correlations were of low or negligible magnitude and some were negative. On the other hand, the correlations between NCE gains and cost-effectiveness ratios were substantial in magnitude and statistically significant. Project schools that were effective also tended to be cost-effective. In most instances, cost appeared to be a relative constant in comparison with the outcome measures. Although this finding does not argue against the conduct of cost-effectiveness analysis, it questions the usefulness of performing such analyses when cost data show a relative small coefficient of variation.

The policy implications of the present research are obviously not limited to the Honolulu School District. The study contributes to the already broad, albeit somewhat confused, research base for bilingual education and sheds some light on the debate over the efficacy of various project settings and types of instruction. It fills in one more piece to the puzzle over the use of native languages in bilingual education. On the other hand, it would be easy to over-generalize the findings to student populations that differ significantly from those served by the SLEP Program with respect to ethnic, cultural and linguistic backgrounds. We wish to caution against making such generalizations.

There is ample evidence that bilingual projects are among the most difficult educational interventions to implement (Bissell, 1979; Berke, 1983; Yap, 1984). A large degree of organizational change and mutual adaptation is required to implement a successful bilingual education program. Local capacity building and strong commitment supported by a well-planned inservice program are also needed. Given the complexity of program implementation, the overall favorable pattern of performance of the SLEP participants should provide a sense of great accomplishment on the part of the program staff. The lack of consistent evidence favoring one project setting or type of instruction over another is generally in keeping with past research in education (e.g., Averch et al., 1972; Bridge et al., 1979; Walberg & Fowler, 1987). It appears that the fluid and dynamic realities of the classroom often involve countless variables which co-exist and interact with one another sequentially and simultaneously. The difficulty in analyzing simultaneous interactions is probably the primary reason why significant and consistent findings in educational research have been scarce.

In support of this line of reasoning, it is instructive to consider a model of effective teaching proposed by Robert Slavin at a recent school improvement conference in Portland, Oregon. The QAIT model consists of four elements:

- Quality of instruction
- Appropriate level of instruction
- Incentive
- Time

Effective teaching (or learning) occurs only when all four elements are present simultaneously. High quality instruction alone would not lead to learning in the absence of the other elements. Effective grouping practices must be put in place to make it possible to provide the appropriate level of instruction. It is simply unrealistic to expect youngsters to sit and learn for hours without incentives. Adequate time must be made available for each student to master the desired skills and knowledge. However, time-on-task would not result in learning in the absence of the other elements.

The model does not presume that a good teacher creates these four elements anew for every class. The teacher's job is, rather, to make sure that the elements are present. For example, students, particularly those from suburban middle class families, often come to school with sufficient incentive to learn. School schedules often do allow enough time for most students to master material covered in a class. It is when one or more of these elements are absent that teaching becomes a formidable challenge. The teacher

must then create these elements so that effective teaching may take place.

Instruction staff in bilingual and general education alike must collectively possess sufficient creative talent and dedication to ensure the existence or creation of the four effective teaching elements. Any staff development and program improvement effort must have, as its long-range goals, the promotion and enhancement of such capacities at the classroom level.

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Association, New Orleans.

Table 1

Achievement Gains of 1985-86 SLEP Participants

	Elementary (n = 95)		Intermediate (n = 27)		High (n = 26)	
Subject Area	Mean	S.D.	Mean	S.D	Mean	S.D.
BINL	27.70	18.97	20.57	11.98	16.45	15.64
MAT-R	4.42	7.13	5.44	4.09	2.30	5.49
MAT-L	8.74	9.62	1.58	5.61	-.39	5.88
MAT-M	4.33	9.22	2.73	6.60	2.16	5.79
GPA-M	3.22	.46	3.59	.45	3.27	.48
GPA-L	2.83	.36	3.16	.46	3.07	.36
GPA-R	2.87	.41	3.57	.84	3.77	.43
GPA-S/L	2.98	.38	3.68	.48	3.47	.39

Note: a. SLEP classes were used as the unit of analysis.

b. Data based on a total of 2,507 SLEP students.

Table 2

Achievement Gains of 1986-87 SLEP Participants

	Elementary (n = 100)		Intermediate (n = 35)		High (n = 29)	
Subject Area	Mean	S.D.	Mean	S.D.	Mean	S.D.
BINL	34.94	13.59	18.53	10.30	17.64	9.55
MAT-R	3.86	8.87	9.80	6.51	2.95	8.12
MAT-L	11.63	10.88	.45	6.49	1.99	6.53
MAT-M	7.69	8.82	2.85	8.47	.27	4.39
GPA-M	3.08	.42	3.62	.42	3.21	.39
GPA-L	2.71	.35	3.50	.56	3.15	.51
GPA-R	2.77	.42	3.41	.66	3.26	.85
GPA-S/L	2.83	.32	3.45	.61	3.73	.77

Note: a. SLEP classes were used as the unit of analysis.

b. Data based on a total of 2,439 SLEP students.

Table 3

Percent of SLEP Students Failing in Regular School Work

Subject Area	Percent Failing 1985-86	1986-87
Mathematics	5.1	3.5
Language Arts	5.0	5.5
Reading	4.1	4.9
Speaking/Listening	1.9	3.4

Note: a. The 1985-86 data included a total of 2,483 students.

b. The 1986-87 data included a total of 2,516 students.

Table 4

Comparisons between Pull-out and Other Settings

Subject Area	Elementary	Intermediate	High
BINL	- (+)	- (-)	+ (N)
MAT-R	- (-)	+ (-)	+ (+)
MAT-L	- (+)	- (+)	+ (-)
MAT-M	- (+)	- (-)	+ (+)
GPA-M	+ (+)	- (-)	+ (-)
GPA-L	+ (+)	- (-)	- (+)
GPA-R	+ (+)	- (+)	+ (N)
GPA-S/L	+ (+)	- (-)	+ (N)

Note: a. A plus sign indicates that the comparison favors the pull-out setting. A minus sign indicates that the comparison favors other settings. None of the comparisons revealed any statistically significant differences at the .05 level. An N in parentheses indicates that no data were made available to make the comparison.

b. Signs without parentheses were based on 1985-86

data. Signs in parentheses were based on 1986-87 data.

c. The 1985-86 data included 77 elementary classes (74 pull-out and 3 others), 18 intermediate classes (10 pull-out and 8 others) and 14 high school classes (2 pull-out and 12 others).

d. The 1986-87 data included 84 elementary classes (82 pull-out and 2 others), 20 intermediate classes (4 pull-out and 16 others) and 22 high school classes (1 pull-out and 21 others).

e. Projects using a combination of pull-out and other settings were excluded from the analysis.

Table 5

Comparisons between ESL and Bilingual Instruction

Subject Area	Elementary	Intermediate	High
BINL	- (-)	- (-)	- (+)
MAT-R	+ (-)	- (+)	+ (+)
MAT-L	+ (+)	+ (+)	+ (-)
MAT-M	+ (+)	+ (+)	+ (+)
GPA-M	+ (+)	+ (+)	+ (+)
GPA-L	- (+)	- (-)	+ (-)
GPA-R	- (+)	+ (+)	(N) (-)
GPA-S/L	+ (+)	+ (+)	+ (-)

Note: a. A plus sign indicates that the comparison favors ESL. A minus sign indicates that the comparison favors bilingual. Only one of the comparisons (for MAT-R at the intermediate level for school year 1985-86) revealed a statistically significant difference favoring bilingual at the .01 level. An N in parentheses indicates that no data were made available to make the comparison.

b. Signs without parentheses were based on 1985-86 data. Signs in parentheses were based on 1986-87 data.

c. The 1985-86 data included 32 elementary classes (30 ESL and 2 bilingual), 11 intermediate classes (7 ESL and 4 bilingual) and 8 high school classes (6 ESL and 2 bilingual).

d. The 1986-87 data included 35 elementary classes (31 ESL and 4 bilingual), 6 intermediate classes (3 ESL and 3 bilingual) and 8 high school classes (7 ESL and 1 bilingual).

e. Projects using a combination of ESL, bilingual and other types of instruction were excluded from the analysis.

Table 6

Correlations between English Use and Achievement Gains

Subject Area	Elementary		Intermediate		High
	85-86	86-87	85-86	86-87	86-87
BINL	.01	-.11	.31	-.04	.07
MAT-R	-.07	-.03	.06	-.21	.13
MAT-L	-.13	-.14	-.25	.06	.04
MAT-M	-.05	-.07	-.21	.03	.04
GPA-M	.03	-.14	-.13	-.30	-.16
GPA-L	.00	-.20	.13	.22	-.10
GPA-R	.02	-.14	-.11	.24	-.32
GPA-S/L	.00	-.09	-.12	.00	-.10

Note: a. The 1985-86 data included 77 elementary and 22 intermediate classes; no data were available for an analysis at the high school level. The 1986-87 data included 76 elementary, 25 intermediate and 21 high school classes.

b. None of the correlation coefficients was statistically significant at the .05 level.

Table 7

Correlations between Per-Pupil Cost and Achievement Gain

	Elementary (n = 33)		Secondary (n = 15)	
Subject Area	1985-86	1986-87	1985-86	1986-87
BINL	.05	-.15	.02	.26
MAT-M	-.20	-.05	.25	.52*
MAT-L	-.10	-.31	.17	.20
MAT-R	-.16	.26	.17	.40

* $p < .05$

Note: Schools were used as the unit of analysis. Schools with incomplete data were excluded from analysis.

Table 8

Correlations between NCE Gains and Cost-Effectiveness Indices

	Elementary (n = 33)		Secondary (n = 15)	
Subject Area	1985-86	1986-87	1985-86	1986-87
BINL	-.75**	-.83**	-.69**	-.70**
MAT-M	-.77**	-.61**	-.82**	-.83**
MAT-L	-.57**	-.57**	-.92**	-.73**
MAT-R	-.74**	-.68**	-.78**	-.67**

** $p < .01$